

CLAIMS

We claim:

1. A system for measuring geometric relationships of components associated with a body in motion, comprising:
 - 5 a. a means for generating an electronic image;
 - b. a triggering means coupled to the means for generating;
 - c. a computer means coupled to the means for generating, the computer means being capable of storing the electronic image;
 - d. a software means running on the computer means, the software means being capable of measuring a geometric relationship between at least two elements of the electronic image.
- 10 2. The system of claim 1, wherein the body in motion comprises a person, and at least one of the at least two elements is selected from the group consisting of arms, hands, shoulders, legs, feet, wrists, head, spine, waist, and breastbone.
- 15 3. The system of claim 2, wherein the person is swinging a golf club, and at least one of the at least two elements is selected from the group consisting of a club head, a golf club grip and a golf club shaft.
4. The system of claim 3, wherein the at least two elements comprise an arm leading a golf swing and the club shaft, further wherein the geometric relationship comprises an angle between the arm leading the golf swing and the club shaft.
- 20 5. The system of claim 1, wherein the means for generating comprises:
 - a. a video camera; and
 - b. a second shutter;wherein the triggering means actuates the second shutter.
- 25 6. The system of claim 1, wherein the means for generating comprises:
 - a. a video camera; and
 - b. a strobe light;wherein the triggering means actuates both the video camera and the strobe light.
7. A system for measuring spatial relationships relative to a body in motion, comprising:
 - 30 a. a video camera, the video camera having an image capture rate;

- b. a second shutter, the second shutter having a shutter speed that is not equal to the image capture rate;
- c. a means for actuating the second shutter; and
- d. a means for displaying a video image coupled to the video camera.

5 8. The system of claim 7, further comprising software means for making spatial measurements between at least two elements of the video image.

9. The system of claim 8, wherein the second shutter is selected from the group consisting of mechanical shutters, electro-mechanical shutters, ferroelectric crystal shutters and liquid crystal display shutters.

10 10. The system of claim 7, wherein the means for actuating comprises a sensor selected from the group consisting of electromagnetic sensors, optical sensors, electronic sensors and acoustic sensors.

11. The system of claim 10, wherein the means for actuating comprises a luminous intensity detection region.

15 12. The system of claim 11, wherein the image capture rate is slower than the shutter speed.

13. The system of claim 12, wherein the body in motion comprises a person executing a physical motion.

14. The system of claim 13, wherein the body in motion comprises a golfer making a golf swing.

20 15. The system of claim 14, wherein the means for actuating is positioned such that the second shutter is open while a golf ball is in contact with a clubface, further wherein the spatial measurement comprises an angle between the golfer's leading forearm and a club shaft.

16. The system of claim 7, wherein the means for displaying comprises a computer, further wherein the software means comprises video imaging software that allows a user to create a graphic overlay atop the video image, and further allows the user to take angular or linear measurements between components of the graphic overlay.

25 17. The system of claim 7, wherein when the means for actuating actuates the second shutter, the second shutter opens at least a first and a second times, with a predetermined time interval between the at least a first and the at least a second time, wherein the video camera generates at least a first and a second image.

18. The system of claim 7, further comprising a mechanical measurement device.
19. The system of claim 7, wherein the spatial relationship is selected from the group consisting of angles, velocities, acceleration, deceleration, efficiencies, rotation direction, position and rotational speed.
- 5 20. The system of claim 7, wherein the second shutter is driven by a pulse comprising:
 - a. a leading edge pulse of more than 10V for a duration of less than 5 usec; and
 - b. a following pulse of less than 10V for a duration of less than .5msec.